PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements relating to Dynamo-Electric Machines

We, THE ENGLISH ELECTRIC COMPANY LIMITED, of English Electric House, Strand, London, W.C.2., (formerly of Queens House, 28 Kingsway, London, W.C.2.), a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to dynamo-electric machines, of the kind having a laminated stator core arranged to be cooled by fluid flowing through the stator core under a pressure substantially higher than that of the atmosphere in the rotor space, and stator windings sealed from the rotor space of the machine.

According to the invention, in such a machine, the stator bore is sealed from the rotor space by a relatively thin layer of a first non-conducting and non-magnetic material which is intimately bonded to the stator bore against the pressure of said fluid so as to form a cylindrical sealing sleeve extending the full length of the stator bore.

According to a preferred feature of the invention, the said first non-conducting and non-magnetic material is a thermo-setting plastic resin.

The pressure of the coolant may be such that the sleeve must have considerable mechanical strength, which has in the past been obtained by using for the sleeve either a thin metal cylinder or a thick-walled non-metallic cylinder, either of which considerably increases the electrical losses and is therefore detrimental to the performance of the machine.

According to another preferred feature of the invention, the resin is reinforced with a second non-conducting and non-magnetic material, a preferred reinforcing material being glass fibre.

According to another preferred feature of the invention, in a dynamo-electric machine having semi-closed slots in the stator core for carrying the stator windings, a non-conducting and non-magnetic material is intimately bonded into the open end of each slot so as to provide with the stator teeth between the slots a continuous annular surface to which the said thin cylindrical sleeve is intimately bonded. The material intimately bonded into the slots is preferably the same as the said first non-conducting and non-magnetic material of which the thin cylindrical sleeve is made.

According to a further preferred feature of the invention, the ends of the stator core are sealed from the rotor space by end members extending axially between the said ends and end sealing members of the winding overhang spaces, the cylindrical sleeve being extended axially at each end thereof so as to over lap the end members and being intimately bonded thereto.

A preferred arrangement according to the invention, applied to an induction motor, will now be described with reference to the drawings accompanying the Provisional Specification, of which:—

Fig. 1 is a sectional elevation through part of the laminated stator of the motor, and

Fig. 2 is a section on the line II—II of Fig. 1.

The motor includes a stator frame 10 and a fluid-cooled laminated stator core 11 which is clamped in position between stator endrings 12. Stator windings 13, disposed in semi-closed slots 14, are held in position by slot wedges 15 and insulated from the core 11 by slot liners 16. The winding

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overhang portions 13*a* are contained within stator end spaces 22. Coolant (not shown) circulates under a pressure substantially higher than that of the atmosphere in the rotor space through the interstices between the conductors 13 and in the end spaces 22 of the stator.

Between each slot wedge 15 and the bore of the stator core 11 is a fillet of thermo-setting plastic resin 17 intimately bonded into the open end of the slot 14. The fillets 17 have the effect of bridging the slots 14 so as to form with the teeth of the stator between the slots a continuous annular surface to the stator core. The rotor (not shown) is mounted in the rotor space 19.

On to this annular surface of the stator core there is formed in situ a layer of thermo-setting plastic resin, approximately 0.01 in. thick, of a kind which adheres strongly to both the stator teeth and the fillets 17 between the teeth, reinforced with glass fibre to form a relatively thin cylindrical sleeve 18 extending the full length of the stator bore. The sleeve 18 effectively seals the rotor space 19 from the coolant in the stator core 11. The thermo-setting resin may for example be an epoxy resin of the kind known by the Registered Trade Mark "ARALDITE". At each end of the stator is an end sleeve member 20 of insulating material, which is sealed on to an annular disc 21, with which it co-operates to prevent coolant entering the rotor space 19 from the stator end space 22. Each sleeve member 20 butts on to one of the stator endrings 12 and is bonded thereto, and the sleeve 18 is continued axially beyond each endring 12 to form a portion 18*a* overlapping the sleeve member 20, the overlapping portion 18*a* being bonded to the sleeve 20 so as to improve the sealing at the end of the stator core between endring 12 and sleeve 20. The sleeve members 20 and 18 together thus combine to form a continuous cylindrical seal which seals the rotor space from the stator core and windings.

The fillet 17 and sleeve 18 form a continuous medium due to their adhesive properties on application, so that the member 18 not only adheres to the stator core 11 over substantially its whole bore, but is secured to the stator core at every slot by a dovetailed joint which extends the full length of the core.

WHAT WE CLAIM IS:—

1. A dynamo-electric machine of the kind having a laminated stator core arranged to be cooled by fluid flowing through the stator core under a pressure substantially higher than that of the atmosphere in the rotor space, and stator windings sealed from the rotor space of the machine, wherein the stator bore is sealed from the rotor space by a relatively thin layer of a first non-conducting and non-magnetic material which is intimately bonded to the stator bore against the pressure of said fluid so as to form a cylindrical sealing sleeve extending the full length of the stator bore.

2. A dynamo-electric machine according to Claim 1, wherein the said first non-conducting and non-magnetic material is a thermo-setting plastic resin.

3. A dynamo-electric machine according to Claim 2, wherein the thermo-setting plastic resin is reinforced with a second non-conducting and non-magnetic material.

4. A dynamo-electric machine according to Claim 3, wherein the thermo-setting resin is reinforced with glass fibre.

5. A dynamo-electric machine according to any preceding claim, having semi-closed slots in the stator core for carrying the stator windings, wherein a non-conducting and non-magnetic material is intimately bonded into the open end of each slot so as to provide with the stator teeth between the slots a continuous annular surface to which the said cylindrical sleeve is intimately bonded.

6. A dynamo-electric machine according to Claim 5, wherein the material intimately bonded into the slots is the same as the said first non-conducting and non-magnetic material of which the thin cylindrical sleeve is made.

7. A dynamo-electric machine according to any preceding Claim, wherein the ends of the stator core are sealed from the rotor space by end sleeve members extending axially between the said ends and end sealing members of the winding overhang spaces, the cylindrical sleeve being extended axially at each end thereof so as to overlap the end sleeve members and being intimately bonded thereto.

8. A dynamo-electric machine substantially as described in the accompanying specification with reference to the drawings accompanying the Provisional Specification.

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Great Britain

963880 PROVISIONAL SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

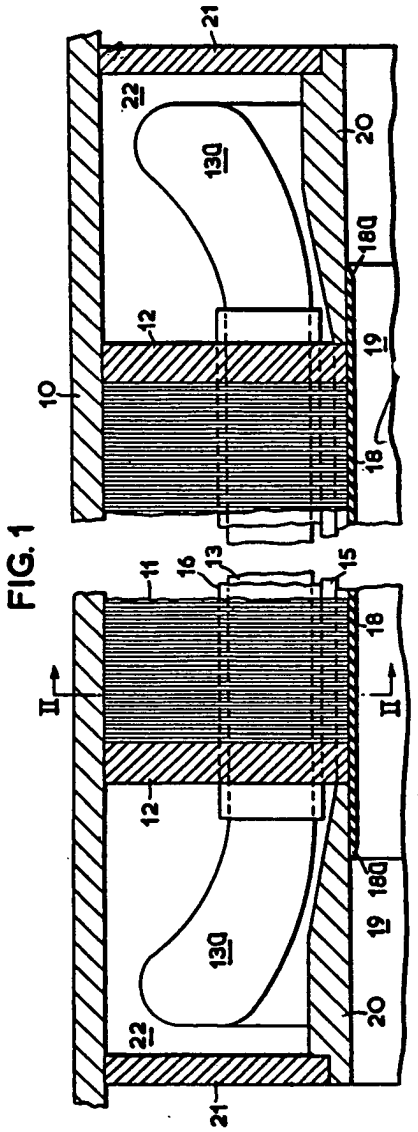

FIG. 1

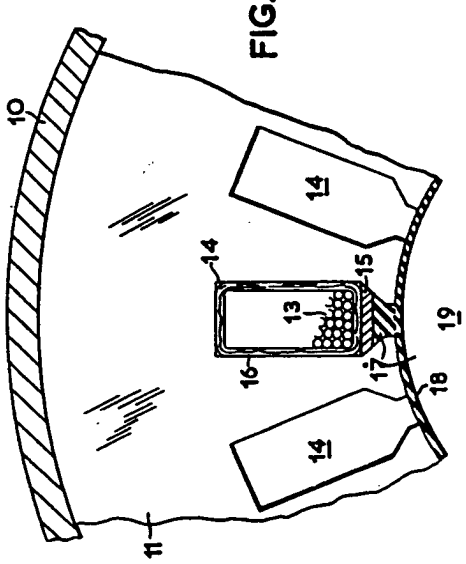

FIG. 2